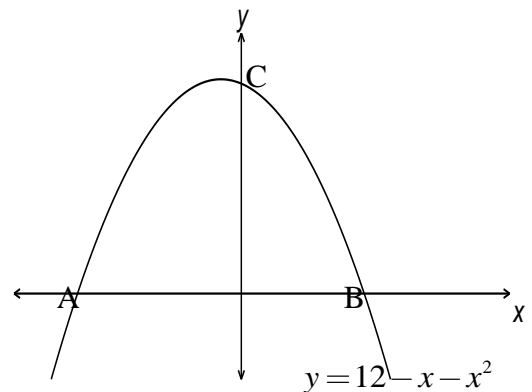


## National 5

### Homework RE8

1.
  - (a) Factorise  $x^2 - 8x + 12$ .
  - (b) Sketch the graph of  $y = x^2 - 8x + 12$ , showing clearly where the graph meets the coordinate axes.
  - (c) Find the equation of the axis of symmetry and the minimum value of the function.
2. Find the roots of  $x^2 - 4x + 1 = 0$ , correct to 2 decimal places.
3. Sketch the graph of each of these functions. Show the coordinates of the points of intersection with the axes, and show also the coordinates of the turning points.
  - (a)  $y = x^2 + 2x - 8$
  - (b)  $y = x^2 - 7x + 10$
  - (c)  $y = 6x - x^2$
4.
  - (a) Draw a sketch of the graph of  $y = x^2$ .
  - (b) Hence sketch the following graphs.  
Remember to show on each graph the coordinates of all intersections with the axes and the turning point.
    - (i)  $y = x - 3^2$
    - (ii)  $y = x - 3^2 + 5$
    - (iii)  $y = x - 3^2 - 4$
5.
  - (a) Simplify  $\frac{a^3 \times a^{-7}}{a^{-2}}$
  - (b) Expand and simplify  $3x - 4 \quad 2x - 3^2$
  - (c)  $f \ x = x^{3/2}$ . Find  $t$  such that  $f \ t = 8$
6. The sketch below shows the graph of  $y = 12 - x - x^2$ .  
The curve crosses the  $x$ -axis at A and B and the  $y$ -axis at C.



7. Change the subject of the formula  $t = \frac{7s + 4}{2}$  to  $s$ .

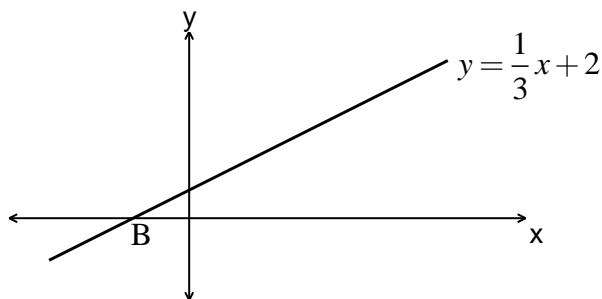
8. A bag has 27 marbles. Some are black and some are white.  
The probability that a marble chosen at random is black is  $\frac{4}{9}$ .
- What is the probability that a marble chosen at random is white?
  - How many white marbles are in the bag?

9. (a) Copy and complete the table for the function  $y = 2^x$ .

$x$	-3	-2	-1	0	1	2	3	4
$y = 2^x$								

- Use your values to draw a rough sketch graph of  $y = 2^x$ .
10. Repeat Question 9 for the function  $y = 3^x$ , taking  $x$ -values from  $-2$  to  $3$ .  
Do the sketch for  $y = 3^x$  on the same diagram as Q9 (b).
11. A straight line has equation  $y = mx + c$ , where  $m$  and  $c$  are constants.
- The point  $2, 7$  lies on this line.  
Write down an equation in  $m$  and  $c$  to illustrate this information.
  - A second point  $4, 17$  also lies on this line.  
Write down another equation in  $m$  and  $c$  to illustrate this information.
  - Hence calculate the values of  $m$  and  $c$ .
  - Write down the gradient of this line.

12. Part of the graph of the straight line  $y = \frac{1}{3}x + 2$  is shown below.



- Find the coordinates of B.
  - For what values of  $x$  is  $y < 0$ ?
13. (a) Simplify  $\sqrt{2} \times \sqrt{18}$   
(b) Simplify  $\sqrt{2} + \sqrt{18}$   
(c) Hence show that  $\frac{\sqrt{2} \times \sqrt{18}}{\sqrt{2} + \sqrt{18}} = \frac{3\sqrt{2}}{4}$